

**MORBIDITY AND MORTALITY WEEKLY REPORT**

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*Current Trends***Measles — United States, First 26 Weeks, 1986**

During the first 26 weeks of 1986, a provisional total of 3,921 measles cases was reported in the United States, an increase of 117.6% over the 1,802 cases reported during the same period in 1985 (7). The overall incidence rate for the 26-week period in 1986 was 1.7/100,000 population, compared with 0.8/100,000 for 1985. Nine states accounted for 3,185 (81.2%) cases: New Jersey (876), Illinois (412), New York (369), California (299), Arkansas (278), South Carolina (274), Arizona (243), Texas (242), and Wisconsin (192). Eighteen states and New York City had incidence rates greater than 1/100,000 population. Seven states and New York City had incidence rates greater than 3/100,000 population: Arkansas, New Jersey, Arizona, South Carolina, Kansas, Wisconsin, and Illinois. During the first 26 weeks of 1986, 42 states and 9.0% of the nation's 3,139 counties reported measles cases (indigenous or imported), compared with 20 states and 2.5% of the counties in 1985.

Eighty outbreaks (i.e., five or more epidemiologically linked cases) have occurred: nine had more than 100 cases each (three of these had more than 200 cases); five had 51-100 cases each; 11 had 26-50 cases each; and 55 had up to 25 cases.

Detailed information was provided to CDC's Division of Immunization on all 3,921 cases. Of these, 3,824 (97.5%) met the standard case definition for measles*, and 1,174 (29.9%) were serologically confirmed. The number of cases reported weekly began to rise soon after the first of the year and reached a maximum at week 11. The decrease in the number of patients with rash onset after week 21 may be due to a delay in reporting rather than a true decrease (Figure 1).

The incidence rate of measles in all age groups increased substantially between 1985 and 1986. However, the age characteristics of cases differed between the two 26-week periods (Table 1). During the first 26 weeks of 1985, the highest incidence rate was reported for persons 15-19 years of age. By comparison, during the first 26 weeks of 1986, the highest incidence rate occurred among children 0-4 years of age (7.0/100,000), followed by children 10-14 years of age (5.7/100,000). The latter group had the greatest increase in incidence rate between years. Of the 1,249 reported cases among preschool-aged children, 355 (28.4%) were infants under 1 year of age; 212 (17.0%) were 12-14 months of age; 55 (4.4%) were 15 months of age; and 627 (50.2%) were 16 months-4 years of age.

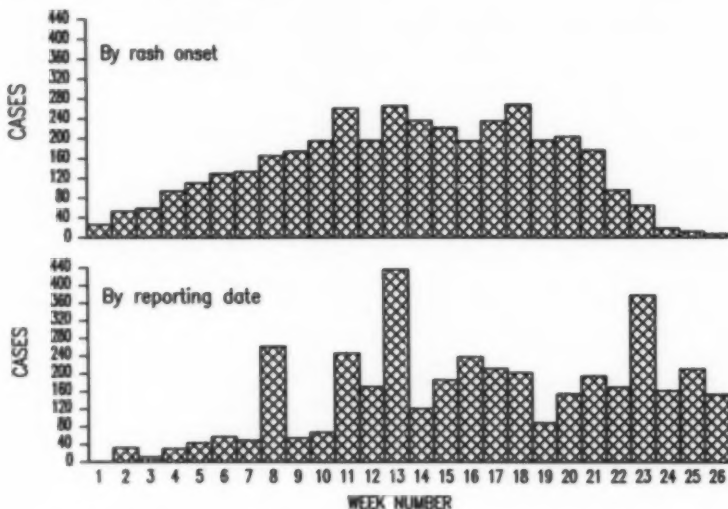
*Fever (38.3 C [101 F] or higher, if measured), generalized rash of 3 days or longer duration, and at least one of the following: cough, coryza, conjunctivitis.

Measles — Continued

Of the 2,466 (62.9%) patients for whom setting of transmission was reported, 1,371 (55.6%) acquired measles in primary or secondary schools; 203 (8.2%), in colleges or universities; 423 (17.2%), at home; 143 (5.8%), in medical settings; 72 (2.9%), in day care; and 254 (10.3%), in a variety of other settings, including churches, sporting events, and summer camps.

Seventy-three (1.9%) cases were international importations. An additional 41 cases were epidemiologically linked to an international importation within two generations of infection.

FIGURE 1. Reported measles cases, by week of rash onset and by week of report* — United States, first 26 weeks, 1986



*MMWR data; includes patients with rash onset in 1985.

TABLE 1. Age distribution and estimated incidence rates of measles — United States, first 26 weeks, 1985* and 1986*

Age group (yrs.)	1985			1986		
	No.	(%)	Rate [†]	No.	(%)	Rate [†]
0-4	466	(25.9)	2.5	1,249	(31.9)	7.0
5-9	152	(8.4)	0.9	430	(11.0)	2.6
10-14	319	(17.7)	1.8	1,006	(25.7)	5.7
15-19	603	(33.5)	3.1	749	(19.1)	3.9
20-24	175	(9.7)	0.8	243	(6.2)	1.1
≥ 25	86	(4.8)	0.1	224	(5.7)	0.2
Unknown	0	(0.0)		20	(0.5)	
Total	1,801	(100.0)	0.8	3,921	(100.0)	1.7

*Provisional data.

[†]Per 100,000 population.

Measles — Continued

Therefore, a total of 114 (2.9%) of all cases were programmatically classified as international importations during this period (2). However, it is likely that additional cases—for which source information was not available—were related to international importations.

A total of 1,730 (44.1%) patients had been vaccinated on or after the first birthday, including 724 (18.5%) who were vaccinated at 12–14 months of age. There were 2,001 (51.0%) unvaccinated patients, and 190 (4.8%) with histories of inadequate vaccination (vaccinated before the first birthday).

Of the 3,921 cases, 1,403 (35.8%) were classified as preventable (2) (Table 2). From 1985 to 1986, the absolute number and proportion of cases that were preventable increased in each age group. The highest proportion of preventable cases occurred among persons who were not of school age: 85.0% of cases among children 16 months–4 years of age were preventable (Table 2). Only 28.7% of cases among school-aged persons 5–19 years of age were preventable; however, 44.1% of all preventable cases occurred in this age group.

TABLE 2. Age distribution and preventability of measles cases — United States, first 26 weeks, 1985* and 1986*

Age group	1985		1986		Percent change [†]
	Total cases	Preventable cases No. (%)	Total cases	Preventable cases No. (%)	
≤ 15 mos.	242	0 (0.0)	622	0 (0.0)	0.0
16 mos.–4 yrs.	224	155 (69.2)	627	533 (85.0)	+22.8
5–9 yrs.	152	32 (21.1)	430	144 (33.5)	+58.8
10–14 yrs.	319	52 (16.3)	1,006	242 (24.1)	+47.9
15–19 yrs.	603	135 (22.4)	749	238 (31.8)	+42.0
20–24 yrs.	175	60 (34.3)	243	174 (71.6)	+108.7
25–29 yrs.	53	32 (60.4)	88	72 (81.8)	+35.4
≥ 30 yrs.	33	0 (0.0)	136	0 (0.0)	0.0
Total	1,801	466 (25.9)	3,901[§]	1,403 (35.8)	+38.2

*Provisional data.

[†]In percentage of preventable cases.

[§]Excludes 20 for whom preventability status is not known.

TABLE 3. Reasons measles cases were classified as nonpreventable — United States, first 26 weeks, 1986*

Causes of nonpreventability	No. cases (%)	Percentage of total cases
Persons < 16 mos. of age	622 (24.7)	15.9
Persons born before 1957	136 (5.4)	3.5
Persons 16 mos.–28 yrs. of age	1,760 (69.9)	44.9
Adequately vaccinated	1,658 (94.2)	
Prior physician diagnosis	1 (0.1)	
Non-U.S. citizens	28 (1.6)	
Exemptions [†]	73 (4.1)	
Laboratory evidence of immunity	0 (0.0)	
Total	2,518 (100.0)	64.2

*Provisional data.

[†]Medical—nine; religious—41; philosophic—23.

Measles - Continued

Of the 2,518 nonpreventable cases, 622 (24.7%) were among persons too young for routine vaccination (under 16 months of age), and 136 (5.4%) were too old (born before 1957). Of the 1,760 who were between 16 months and 29 years of age, 1,658 (94.2%) had been vaccinated on or after the first birthday; one (0.06%) had a prior physician diagnosis of measles; 28 (1.6%) were non-U.S. citizens; and 73 (4.1%) had medical contraindications or exemptions under state law (Table 3).

Reported by Div of Immunization, Center for Prevention Svcs, CDC.

Editorial Note: The 3,921 measles cases reported through week 26 of 1986 exceed the total number of reported cases in any year since 1980, when 11,564 cases were reported during the comparable period. The 1986 figure is almost four times higher than the all-time low of 1,037 cases reported during the same period of 1983. Although the number of reported cases still represents less than 1% of that in the prevaccine era (3), when an average over 500,000 cases was reported annually, there is concern about the recent increase.

Incidence rates have increased in all age groups in 1986. The greatest increase (216.7%) occurred among persons 10-14 years of age. The highest incidence rate was in preschoolers who have accounted for almost one-third of all cases in 1986. The large number of cases among children 10-14 years of age was due to several large outbreaks in middle schools this

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TABLE I. Summary—cases specified notifiable diseases, United States

Disease	33rd Week Ending			Cumulative, 33rd Week Ending		
	Aug. 16, 1986	Aug. 17, 1985	Median 1981-1985	Aug. 16, 1986	Aug. 17, 1985	Median 1981-1985
Acquired Immunodeficiency Syndrome (AIDS)	303	198	N	7,938	4,819	N
Asplenic meningitis	347	457	432	4,544	4,237	4,237
Encephalitis, Primary (arthropod-borne & unsp.)	33	39	47	578	656	705
Post-infectious	1	1	1	68	87	64
Gonorrhea: Civilian	18,827	19,893	18,903	546,209	550,867	562,150
Military	346	511	511	10,441	13,296	15,420
Hepatitis: Type A	362	416	434	13,615	13,643	13,643
Type B	458	523	466	16,193	15,953	14,863
Non A, Non B	62	83	N	2,233	2,594	N
Unspecified	71	110	150	2,938	3,605	4,533
Legionellosis	18	10	N	387	451	N
Leprosy	1	9	7	169	250	161
Malaria	17	46	39	609	641	641
Measles: Total*	177	64	25	5,114	2,300	2,197
Indigenous	174	52	N	4,879	1,930	N
Imported	3	12	N	235	370	N
Meningococcal infections: Total	17	23	36	1,724	1,635	1,944
Civilian	17	23	36	1,722	1,629	1,940
Military	-	-	-	2	6	9
Mumps	55	28	28	3,210	2,117	2,380
Peritonsillitis	68	86	54	1,823	1,412	1,308
Rubella (German measles)	11	10	10	379	476	745
Syphilis (Primary & Secondary): Civilian	390	551	640	16,293	16,827	19,051
Military	2	3	6	110	118	238
Toxic Shock syndrome	12	7	N	228	252	N
Tuberculosis	357	481	478	13,597	13,300	14,621
Typhus	4	2	8	79	110	148
Typhoid fever	2	11	13	175	217	242
Typhus fever, tick-borne (RMSF)	36	35	36	486	433	720
Rabies, animal	131	99	140	3,483	3,356	4,038

TABLE II. Notifiable diseases of low frequency, United States

	Cum 1985		Cum 1986
Anthrax	-	Leptospirosis	23
Botulism: Foodborne	6	Plague	4
Infant (Utah 1)	30	Poliomyelitis, Paralytic	0
Other	1	Psittacosis (N.C. 1, Colo. 2)	87
Brucellosis (Va. 2, Mont. 1, Colo. 2, N.Mex. 1)	47	Rabies, human	-
Cholera	-	Tetanus (La. 1, Idaho 1)	38
Congenital rubella syndrome	2	Trichinosis	20
Congenital syphilis, ages < 1 year	107	Typhus fever, flea-borne (endemic, murine)	32
Diphtheria	-		

*Two of the 177 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending
August 16, 1986 and August 17, 1985 (33rd Week)

Reporting Area	AIDS	Aseptic Mening- itis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral, by type)				Legionel- losis	Leprosy
			Primary	Post-in- fectious			A	B	NA,NB	Unspeci- fied		
	Cum 1986	1986	Cum 1986	Cum 1986	Cum 1986	Cum 1985	1986	1986	1986	1986	1986	Cum 1986
UNITED STATES	7,938	347	578	68	546,209	550,667	362	458	62	71	18	169
NEW ENGLAND	347	18	17	3	13,428	14,775	9	26	3	4	1	6
Maine	12	2	-	-	570	687	-	-	-	-	-	-
NH	8	1	2	-	344	355	-	-	-	-	-	-
VT	3	-	2	2	162	196	-	1	-	-	1	-
Mass	187	7	4	-	5,441	5,749	3	19	3	4	-	6
RI	19	5	-	-	1,092	1,132	1	-	-	-	-	-
Conn	118	3	9	1	5,819	6,546	5	2	-	-	-	-
MID ATLANTIC	3,009	48	67	6	93,374	80,080	14	31	1	22	-	11
Upstate N.Y.	295	15	26	4	10,957	10,601	8	9	1	-	-	1
N.Y. City	2,023	15	14	-	54,689	40,326	2	3	-	19	-	9
N.J.	489	18	10	-	11,877	12,180	4	19	-	3	-	-
Pa.	202	-	17	2	15,851	16,973	-	-	-	-	-	1
E.N. CENTRAL	487	91	158	10	71,739	74,012	13	45	7	1	5	4
Ohio	100	15	47	2	18,435	18,767	4	17	3	-	5	-
Ind	46	21	38	3	7,670	7,546	2	9	3	1	-	-
Ill	236	21	33	4	20,473	20,001	-	-	-	-	-	3
Mich	78	34	33	1	22,393	20,771	7	19	1	-	-	1
Wis	25	-	7	-	2,768	6,927	-	-	-	-	-	-
W.N. CENTRAL	153	8	25	8	23,558	25,504	9	16	4	-	2	2
Minn	60	1	12	-	3,345	3,719	-	2	1	-	-	1
Iowa	10	-	7	-	2,385	2,775	2	4	-	-	-	-
Mo	51	3	-	-	11,860	12,292	3	5	1	-	1	-
N. Dak	2	-	-	-	206	171	-	-	-	-	-	-
S. Dak	1	-	5	-	480	471	3	-	-	-	-	-
Nebr	6	1	-	1	1,793	2,234	-	2	-	-	-	-
Kans	23	3	1	7	3,489	3,842	1	3	2	-	-	1
S. ATLANTIC	1,109	91	78	23	141,877	142,302	50	137	16	11	4	1
Del	16	4	5	-	2,252	2,569	1	1	1	-	-	-
Md	123	19	25	1	16,582	18,367	2	20	-	-	-	-
D.C.	132	1	-	-	10,412	9,816	-	2	-	-	-	-
Va	106	28	23	1	11,718	11,927	5	36	6	2	2	1
W. Va	6	4	11	-	1,414	1,533	-	2	-	-	-	-
N.C.	43	6	10	1	21,666	21,564	8	5	-	-	-	-
S.C.	23	-	-	-	12,312	13,628	-	18	1	-	1	-
Ge	170	5	-	1	24,057	28,639	4	24	3	-	-	-
Fla	490	24	2	18	41,264	34,259	32	29	5	8	1	-
E.S. CENTRAL	102	11	40	3	44,586	46,418	5	31	3	-	-	1
Ky	21	9	19	1	4,923	5,250	3	4	1	-	-	-
Tenn	53	2	3	1	17,193	17,866	1	7	-	-	-	-
Ala	18	-	17	1	12,782	14,133	1	11	2	-	-	1
Miss	10	-	1	-	9,688	9,179	-	9	-	-	-	-
W.S. CENTRAL	482	32	73	6	65,456	69,643	30	20	1	13	-	12
Ark	21	-	-	2	8,204	8,676	-	-	-	-	-	-
La	102	-	3	-	11,822	13,768	1	-	-	-	-	-
Okl	27	3	14	-	7,370	7,451	15	5	1	1	-	-
Tex	332	29	56	4	40,060	41,748	14	15	-	12	-	11
MOUNTAIN	201	6	20	1	16,033	17,249	33	22	7	2	1	11
Mont	4	-	-	1	458	474	3	2	1	-	1	-
Idaho	2	-	-	-	531	518	9	4	-	-	-	-
Wyo	4	-	2	-	357	417	-	-	-	-	-	-
Colo	96	4	3	-	4,193	5,137	4	8	1	2	-	3
N. Mex	11	-	3	-	1,620	1,969	9	3	1	-	-	-
Ariz	50	U	8	-	5,082	5,113	U	U	U	U	U	5
Utah	10	1	3	-	696	749	5	2	3	-	-	1
Nev	24	1	1	-	3,096	2,882	3	3	1	-	-	2
PACIFIC	2,046	42	102	8	76,358	80,684	199	130	20	16	5	121
Wash	93	1	11	-	5,798	5,922	25	12	3	1	-	14
Oreg	41	-	-	-	3,171	3,997	35	9	4	1	-	-
Calif	1,873	32	89	8	64,770	67,744	139	106	13	16	5	84
Alaska	9	-	2	-	1,762	1,866	-	2	-	-	-	-
Hawaii	30	9	-	-	859	1,155	-	1	-	-	-	23
Guam	-	1	-	-	113	128	-	-	-	1	-	1
PR	78	-	4	-	1,483	2,201	1	-	-	-	-	7
VI	3	U	-	-	139	316	U	U	U	U	U	-
Pac. Trust Terr	-	-	-	-	276	574	3	-	-	-	-	31
Amer. Samoa	-	-	-	-	30	-	-	-	-	-	-	2

N Not notifiable

U Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending August 16, 1986 and August 17, 1985 (33rd Week)

Reporting Area	Malaria		Measles (Rubella)				Meningococcal Infections		Mumps		Pertussis			Rubella		
			Indigenous		Imported *		Total									
	Cum 1986	1986	Cum 1986	1986	Cum 1986	Cum 1985	Cum 1986	1986	Cum 1986	1986	Cum 1986	Cum 1985	1986	Cum 1986	Cum 1985	
UNITED STATES	609	174	4,879	3	235	2,300	1,724	55	3,210	68	1,823	1,412	11	379	476	
NEW ENGLAND	31	-	74	1	8	123	122	4	53	3	100	78	-	9	12	
Maine	1	-	10	-	-	1	23	-	-	-	2	5	-	-	-	
N.H.	2	-	38	-	-	-	6	-	13	-	48	29	-	1	2	
Vt.	1	-	-	-	-	-	15	1	3	-	3	3	-	1	-	
Mass.	16	-	23	-	6	115	27	3	9	1	28	22	-	4	6	
R.I.	4	-	2	-	-	-	16	-	9	1	4	12	-	2	-	
Conn.	7	-	1	1†	2	7	35	-	19	1	17	7	-	1	4	
MID ATLANTIC	75	68	1,559	-	21	196	273	4	133	6	129	95	-	31	204	
Upstate N.Y.	29	19	62	-	19	82	93	-	52	2	82	58	-	23	17	
N.Y. City	22	49	570	-	2	60	57	-	5	-	3	9	-	5	163	
N.J.	7	-	905	-	-	27	29	3	36	1	11	3	-	3	11	
Pa.	17	-	22	-	-	27	94	1	40	3	33	25	-	-	13	
E.N. CENTRAL	39	14	949	-	16	510	234	33	2,185	12	240	283	2	34	26	
Ohio	10	-	-	-	10	54	93	-	99	11	103	32	-	1	-	
Ind.	2	-	11	-	-	57	19	-	31	-	22	11	-	-	1	
Ill.	14	11	631	-	3	286	66	30	1,617	-	28	30	2	24	10	
Mich.	12	3	53	-	-	54	52	3	248	1	24	29	-	7	14	
Wis.	1	-	294	-	3	59	4	-	190	-	63	161	-	2	1	
W.N. CENTRAL	22	51	321	-	17	11	83	1	82	5	150	94	-	10	19	
Minn.	5	-	45	-	4	6	16	-	1	1	43	28	-	-	2	
Iowa	1	51	132	-	1	-	11	-	21	2	13	5	-	1	1	
Mo.	10	-	25	-	6	2	28	-	15	1	13	24	-	1	7	
N. Dak.	-	-	25	-	1	2	-	-	3	-	4	9	-	1	2	
S. Dak.	-	-	-	-	-	-	4	-	-	-	14	1	-	-	-	
Nebr.	4	-	-	-	-	-	9	-	-	-	1	4	-	-	-	
Kans.	2	-	94	-	5	1	15	1	41	-	62	23	-	7	7	
S. ATLANTIC	76	3	504	-	53	268	321	4	152	13	578	269	-	10	49	
Del.	1	-	1	-	-	-	2	-	-	-	222	-	-	-	1	
Md.	12	2	22	-	9	88	44	-	15	-	136	121	-	-	6	
D.C.	1	-	-	-	2	8	4	-	-	-	-	-	-	-	-	
Va.	18	-	35	-	24	24	53	3	32	3	30	8	-	-	2	
W. Va.	4	-	2	-	-	33	3	-	38	-	20	2	-	-	9	
N.C.	4	-	2	-	1	9	55	-	14	3	41	15	-	-	-	
S.C.	5	-	274	-	-	3	29	1	12	2	13	1	-	-	3	
Ge.	7	1	79	-	14	8	49	-	14	5	95	75	-	-	-	
Fla.	24	-	89	-	3	95	82	-	27	-	21	47	-	10	28	
E.S. CENTRAL	16	-	56	-	8	4	96	1	24	4	37	17	2	4	2	
Ky.	4	-	-	-	6	2	23	1	6	3	5	3	2	4	2	
Tenn.	1	-	54	-	1	1	35	-	15	-	12	5	-	-	-	
Ala.	7	-	-	-	-	-	27	-	2	1	20	6	-	-	-	
Miss.	4	-	2	-	-	1	11	-	1	-	-	3	-	-	-	
W.S. CENTRAL	58	-	585	-	34	419	150	1	147	3	135	211	-	55	29	
Ark.	-	-	276	-	-	-	21	-	7	-	8	12	-	-	1	
La.	8	-	4	-	-	42	22	-	2	1	8	10	-	-	-	
Okl.	8	-	37	-	2	1	20	N	N	-	89	119	-	-	1	
Tex.	42	-	268	-	30	376	87	1	138	2	30	70	-	55	27	
MOUNTAIN	25	-	295	1	26	521	86	2	203	9	184	105	1	21	5	
Mont.	-	-	-	1†	8	137	8	-	5	1	8	5	-	2	-	
Idaho	1	-	1	-	-	135	3	2	6	-	33	7	-	-	-	
Wyo.	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	
Colo.	7	-	2	-	5	10	13	-	11	3	51	32	-	1	-	
N. Mex.	4	-	32	-	7	5	7	N	N	1	17	11	-	-	2	
Ariz.	8	U	252	U	6	234	19	U	167	U	46	24	U	2	1	
Utah	2	-	7	-	-	-	9	-	10	4	25	26	1	13	-	
Nev.	3	-	1	-	-	-	25	-	4	-	3	-	-	3	1	
PACIFIC	267	38	536	1	52	248	359	5	231	13	270	280	6	205	130	
Wash.	21	33	158	-	25	42	53	-	7	3	81	50	3	14	11	
Oreig.	15	-	3	-	4	3	22	N	N	-	10	29	-	-	-	
Calif.	230	4	355	1†	22	184	271	5	201	10	169	182	3	186	75	
Alaska	-	-	-	-	-	-	11	-	6	-	2	28	-	-	1	
Hawaii	1	1	20	-	1	19	2	-	17	-	8	11	-	4	42	
Guam	1	-	4	-	1	11	1	-	4	-	-	-	-	3	2	
P.R.	4	-	33	-	-	50	2	-	21	1	12	9	-	58	25	
V.I.	-	U	-	U	-	10	-	U	13	U	-	-	U	-	-	
Pac. Trust Terr.	-	-	-	-	-	-	1	-	7	-	-	-	-	-	2	
Amer. Samoa	-	-	2	-	-	-	-	-	1	4	-	-	-	1	-	

*For measles only, imported cases include both out-of-state and international importations.

N Not notifiable U Unavailable † International ‡ Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending August 16, 1986 and August 17, 1985 (33rd Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic- shock Syndrome	Tuberculosis		Tula- remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum 1986	Cum 1985		Cum 1986	Cum 1985				
UNITED STATES	16,293	16,827	12	13,597	13,300	79	175	486	3,483
NEW ENGLAND	303	348	1	418	450	1	10	8	3
Maine	15	9	-	31	35	-	-	-	-
NH	10	8	-	10	15	-	-	-	-
Vt	7	5	-	13	4	-	-	-	-
Mass	163	175	1	214	273	1	8	2	-
RI	16	11	-	27	35	-	-	3	1
Conn	92	140	-	123	88	-	2	3	2
MID ATLANTIC	2,355	2,196	-	2,788	2,442	1	14	16	410
Upstate N.Y.	99	155	-	399	430	-	2	7	53
N.Y. City	1,351	1,366	-	1,453	1,193	-	6	5	-
N.J.	422	428	-	484	336	1	5	1	14
Pa	483	247	-	452	483	-	1	3	343
E N CENTRAL	660	708	2	1,627	1,641	-	13	52	82
Ohio	85	93	-	287	301	-	2	50	9
Ind	77	63	-	174	201	-	2	-	13
Ill	351	362	-	713	711	-	2	1	23
Mich	113	148	2	375	325	-	5	1	16
Wis	34	42	-	78	103	-	2	-	21
W N CENTRAL	143	144	-	391	353	22	7	28	566
Minn	26	29	-	98	73	-	1	1	77
Iowa	6	16	-	33	43	-	-	1	125
Mo	78	73	-	191	167	17	5	12	62
N Dak	2	2	-	6	6	-	-	1	124
S Dak	3	4	-	16	18	2	-	5	115
Nebr	11	7	-	7	13	1	-	4	22
Kans	17	13	-	40	33	1	1	4	41
S ATLANTIC	4,939	4,961	2	2,824	2,688	8	24	233	820
Del	32	25	-	27	27	-	1	1	-
Md	282	284	-	192	242	2	6	26	405
D.C.	198	229	-	87	102	-	2	-	26
Va	239	190	1	219	239	2	5	43	116
W Va	14	12	1	74	70	-	3	7	24
N.C.	327	428	-	366	339	1	3	79	6
S.C.	423	505	-	343	337	-	-	55	38
Ga	956	859	-	398	432	3	-	21	124
Fla	2,488	2,429	-	918	900	-	4	1	81
E S CENTRAL	1,065	1,253	-	1,156	1,175	8	2	58	227
Ky	51	39	-	277	267	3	-	11	60
Tenn	390	388	-	331	343	4	1	25	97
Ala	352	406	-	365	357	1	-	14	68
Miss	282	420	-	183	208	-	1	8	2
W S CENTRAL	3,297	3,870	4	1,736	1,627	34	13	83	513
Ark	185	193	-	226	173	24	-	3	117
La	557	660	-	279	221	1	1	-	14
Okla	85	113	1	166	174	6	1	70	44
Tex	2,490	2,904	3	1,065	1,059	3	11	10	338
MOUNTAIN	379	445	2	312	345	4	8	8	489
Mont	6	3	1	18	46	1	1	4	168
Idaho	9	4	1	12	15	-	-	-	2
Wyo	-	6	-	-	5	-	-	1	219
Colo	96	107	-	24	43	-	1	3	12
N. Mex	46	81	-	67	65	1	-	-	5
Ariz	150	218	U	153	141	-	3	-	76
Utah	12	5	-	21	8	1	2	-	3
Nev	60	21	-	17	22	1	1	-	4
PACIFIC	3,152	2,902	1	2,545	2,579	1	84	-	373
Wash	99	79	-	121	144	-	3	-	5
Oreg	74	59	-	67	84	-	-	-	-
Calif	2,952	2,716	1	2,176	2,163	-	77	-	360
Alaska	2	2	-	37	68	1	1	-	8
Hawaii	25	46	-	124	120	-	3	-	-
Guam	1	2	-	33	30	-	-	-	-
PR	564	497	-	198	226	-	4	-	-
VI	-	1	U	1	1	-	-	-	33
Pac. Trust Terr	166	80	-	40	38	-	42	-	-
Amer Samoa	-	-	-	3	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities.* week ending August 16, 1986 (33rd Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total	Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1			All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	804	402	124	35	17	28	38	S ATLANTIC	1,251	746	293	122	49	41	45
Boston, Mass.	189	113	41	12	9	14	15	Atlanta, Ga.	164	92	35	26	8	6	3
Bridgport, Conn.	29	23	3	1	1	1	-	Baltimore, Md.	245	155	50	21	13	6	8
Cambridge, Mass.	25	20	2	1	-	2	1	Charlotte, N.C.	78	43	24	6	4	1	5
Fall River, Mass.	14	12	2	-	-	-	-	Jacksonville, Fla.	109	67	27	8	5	2	9
Hartford, Conn.	54	35	15	1	3	-	3	Miami, Fla.	130	68	31	17	5	9	1
Lowell, Mass.	27	19	5	2	1	-	1	Norfolk, Va.	58	27	18	9	3	1	3
Lynn, Mass.	10	6	2	2	-	-	-	Richmond, Va.	67	38	22	3	1	3	4
New Bedford, Mass.	20	19	-	-	1	-	-	Savannah, Ga.	49	31	11	3	2	2	2
New Haven, Conn.	54	32	15	4	1	2	3	St. Petersburg, Fla.	116	88	21	4	1	2	5
Providence, R.I.	53	34	9	5	-	5	6	Tampa, Fla.	67	34	11	7	2	3	3
Somerville, Mass.	6	4	2	-	-	-	1	Washington, D.C.	162	85	36	17	8	6	2
Springfield, Mass.	45	30	11	2	1	1	6	Wilmington, Del.	26	18	7	1	-	-	-
Waterbury, Conn.	28	20	5	3	-	-	-								
Worcester, Mass.	50	35	12	2	-	1	3								
MID ATLANTIC	2,514	1,566	544	251	65	94	103	E.S. CENTRAL	788	475	179	53	23	37	37
Albany, N.Y.	82	25	16	3	2	5	1	Birmingham, Ala.	100	50	36	7	5	2	-
Albany, N.Y.	22	18	4	-	-	-	-	Chattanooga, Tenn.	57	40	13	4	-	-	3
Buffalo, N.Y.	99	60	26	5	1	7	4	Knoxville, Tenn.	76	55	16	1	-	-	4
Camden, N.J.	37	21	10	4	2	-	-	Louisville, Ky.	111	62	33	9	4	3	6
Elizabeth, N.J.	17	13	4	-	-	-	-	Memphis, Tenn.	214	135	41	12	5	20	13
Englewood, N.J.	38	32	5	-	-	-	2	Mobile, Ala.	58	33	14	6	2	3	2
Jersey City, N.J.	49	29	8	6	-	2	-	Montgomery, Ala.	37	27	5	1	1	3	-
N.Y. City, N.Y.	1,339	838	272	158	33	38	50	Nashville, Tenn.	115	73	21	13	6	2	9
Newark, N.J.	110	42	29	28	8	3	7								
Pateron, N.J.	27	15	5	5	1	1	1	W.S. CENTRAL	1,384	790	312	154	75	51	48
Philadelphia, Pa.	294	186	63	21	10	14	14	Austin, Tex.	68	34	11	14	4	5	1
Pittsburgh, Pa.	72	50	16	2	1	3	3	Baton Rouge, La.	25	15	6	2	2	-	1
Reading, Pa.	37	25	11	1	-	-	8	Corpus Christi, Tex.	45	23	5	10	5	2	7
Rochester, N.Y.	99	63	21	7	5	3	6	Dallas, Tex.	194	102	45	24	12	11	7
Schenectady, N.Y.	26	19	7	-	-	-	-	El Paso, Tex.	61	33	10	3	5	9	1
Scranton, Pa.	15	12	3	-	-	-	-	Fort Worth, Tex.	103	59	23	8	5	8	2
Syracuse, N.Y.	85	57	17	6	2	3	5	Houston, Tex.	326	165	82	49	22	8	10
Trouton, N.J.	48	26	16	4	-	2	1	Little Rock, Ark.	74	47	15	6	2	4	2
Utica, N.Y.	21	16	3	-	-	2	-	New Orleans, La.	139	89	30	15	3	2	4
Yonkers, N.Y.	27	18	8	1	-	-	-	San Antonio, Tex.	203	121	52	15	12	2	11
								Shreveport, La.	50	32	17	-	1	-	6
								Tulsa, Okla.	96	70	16	8	2	-	7
E.N. CENTRAL	2,215	1,403	481	180	70	81	99	MOUNTAIN	605	357	140	47	38	24	24
Akron, Ohio	62	36	6	8	-	2	-	Albuquerque, N.Mex.	130	76	21	10	19	4	4
Canton, Ohio	40	27	8	4	-	1	2	Colorado Springs, Colo.	37	20	9	3	4	1	3
Chicago, Ill.	564	362	125	45	10	22	16	Denver, Colo.	93	51	25	8	1	8	2
Cincinnati, Ohio	89	60	20	6	-	3	7	Las Vegas, Nev.	89	47	29	6	3	4	6
Cleveland, Ohio	166	91	45	15	4	11	2	Ogden, Utah	16	10	2	1	-	3	-
Columbus, Ohio	128	75	35	10	2	6	3	Phoenix, Ariz.	100	56	29	8	4	3	4
Dayton, Ohio	108	74	26	7	-	1	6	Pueblo, Colo.	18	18	2	-	-	-	2
Detroit, Mich.	256	124	65	39	19	9	12	Salt Lake City, Utah	45	30	5	3	7	-	1
Evansville, Ind.	48	32	15	-	-	1	-	Tucson, Ariz.	78	51	18	8	-	1	2
Fort Wayne, Ind.	47	28	11	5	2	1	-								
Gary, Ind.	11	6	-	-	2	1	-	PACIFIC	1,841	1,138	402	174	65	55	109
Grand Rapids, Mich.	66	49	10	3	3	1	5	Berkeley, Calif.	21	13	4	1	-	3	4
Indianapolis, Ind.	158	101	36	10	3	6	5	Fresno, Calif.	87	52	14	8	6	7	11
Madison, Wis.	42	22	6	4	9	1	6	Glendale, Calif.	15	15	-	-	-	-	1
Milwaukee, Wis.	120	87	18	7	5	3	8	Honolulu, Hawaii	42	31	8	2	1	-	4
Peoria, Ill.	44	31	6	1	3	3	3	Long Beach, Calif.	647	324	124	63	25	5	15
Rockford, Ill.	50	36	7	5	-	2	4	Los Angeles, Calif.	74	47	18	4	2	3	7
South Bend, Ind.	59	38	13	3	4	1	6	Oakland, Calif.	53	29	14	3	-	7	2
Toledo, Ohio	119	84	24	4	4	3	14	Pasadena, Calif.	28	18	5	3	1	1	1
Youngstown, Ohio	50	38	5	4	-	3	-	Portland, Oreg.	116	77	27	6	4	2	5
								Sacramento, Calif.	121	78	25	10	5	3	14
W.N. CENTRAL	735	501	139	49	25	21	25	San Diego, Calif.	176	98	35	28	7	8	26
Des Moines, Iowa	46	37	5	1	3	-	1	San Francisco, Calif.	149	90	34	19	2	4	3
Duluth, Minn.	17	13	3	1	-	-	1	San Jose, Calif.	156	96	42	12	6	-	10
Kansas City, Kans.	40	25	9	2	2	2	1	Seattle, Wash.	160	106	34	8	5	7	-
Kansas City, Mo.	125	74	30	12	4	5	5	Spokane, Wash.	59	42	12	2	2	1	4
Louisville, Ky.	22	18	3	1	-	-	2	Tacoma, Wash.	37	22	6	5	-	-	4
Minneapolis, Minn.	129	71	36	12	5	5	1								
Omaha, Neb.	82	57	10	7	5	3	1								
St. Louis, Mo.	139	108	22	6	1	4	7								
St. Paul, Minn.	77	59	10	2	4	2	3								
Wichita, Kans.	58	41	11	5	1	-	3								
TOTAL	11,918	7,378	2,614	1,065	428	420	528								

* Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

** Pneumonia and influenza.

† Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Total includes unknown ages.

§ Data not available. Figures are estimates based on average of past 4 weeks.

Measles — Continued

year involving vaccinated students. The large number of cases in preschoolers was due to two large outbreaks in New York City and New Jersey this year in which predominately preschool-aged children were involved, most of whom were unvaccinated (4). The smallest increase in incidence rate was in persons 15-19 years. There were no large outbreaks on college campuses this year as in 1985 (5).

The reasons for the increase in measles cases and the more widespread occurrence this year are not clear. Investigations of various outbreaks this year indicate no single common problem. Rather, a variety of reasons, including vaccine failures and unvaccinated preschoolers, have contributed to the large number of outbreaks.

As the measles elimination strategy is successfully implemented, the proportion of preventable cases should decrease. Since the percentage of preventable cases increased to 36.6% this year from 25.2% in 1985, further improvement in implementing existing recommendations for measles elimination are necessary (6). As in 1984 and 1985, preschool-aged children over 15 months of age comprised the group with the largest proportion of preventable cases. Greater efforts need to be directed at this age group.

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Epidemiologic Notes and Reports

Occupational Fatality Following Exposure to Hydrogen Sulfide — Nebraska

Hydrogen sulfide (H_2S) is a potential hazard for workers in wastewater-treatment plants. Investigation of an occupational fatality resulting from exposure to H_2S in such a plant illustrates the hazards associated with this agent.

On September 3, 1983, a worker at a wastewater-treatment plant in Omaha, Nebraska, was found unconscious after he had gone to collect samples in the building where wastewater enters the plant. He died later that day from acute respiratory distress syndrome. A review of hospital records and the autopsy report showed the pattern of his fatal illness was compatible with exposure to H_2S .

On September 6, engineers of the City of Omaha requested that the National Institute for Occupational Safety and Health (NIOSH) evaluate working conditions and help develop a health and safety plan for the plant (1). NIOSH investigators collected 40 personal-breathing-zone* and 26 long-term area air samples for H_2S in all areas of the plant. Concentrations of H_2S in the personal air samples ranged from none detected to 2.2 parts per million (ppm); results from the long-term area air samples ranged from none detected to 56.0 ppm.

*Personal air samples are collected in the worker's breathing zone. Long-term area air samples are collected in the work area over an entire work shift. Instantaneous air samples are measured by a direct reading instrument.

Hydrogen Sulfide — Continued

The highest concentrations were found in the area near where the worker was apparently fatally overcome. Instantaneous area air samples for H_2S were also collected in this area. These concentrations ranged from 50 ppm to 200 ppm (the maximum reading on the instrument used) when one of the supply fans in the building malfunctioned.

During the week of October 17, 54 (83%) of the 65 workers in the plant responded to a self-administered questionnaire. Forty-one (76%) respondents indicated that, during the previous 2 weeks, they had experienced at least three of the symptoms known to be associated with H_2S exposure, most commonly cough (61%), eye irritation (57%), and nose irritation (54%). However, no clear association between frequency of symptoms and estimated exposure was found.

The exact circumstances resulting in the worker's death may never be known. NIOSH investigators concluded that the factors contributing to the death included: (1) the summer temperature and the long transit time of the sewage entering the plant (resulting in high concentrations of dissolved H_2S); (2) inappropriate design of the ventilation system; and (3) inadequate safety procedures for workers entering potentially dangerous areas. Based on these factors, NIOSH investigators provided recommendations to prevent any future fatal incidents.

Reported by NIOSH Region VII, Hazard Evaluations and Technical Assistance Br, Div of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health, CDC.

Editorial Note: At room temperature, H_2S is a colorless gas and has a characteristic rotten-egg odor. Although it has a rather low odor threshold (0.13 ppm), it can cause olfactory fatigue at 100 ppm in 2-15 minutes. It is a rapid-acting systemic poison that causes respiratory paralysis with consequent asphyxia at high concentrations (1,000-2,000 ppm). Inhalation of high concentrations may cause coma after a single breath and may be rapidly fatal. Prolonged exposure to 250 ppm H_2S may cause pulmonary edema. Exposure to concentrations above 50 ppm for 1 hour may produce acute conjunctivitis with pain, lacrimation, and photophobia; in severe form, this may progress to keratoconjunctivitis and vesiculation of the corneal epithelium. Prolonged exposure to concentrations as low as 50 ppm H_2S may cause rhinitis, pharyngitis, bronchitis, and pneumonitis. In low concentrations, H_2S may cause headache, fatigue, irritability, insomnia, eye and respiratory irritation, and gastrointestinal disturbances; in somewhat higher concentrations, it affects the central nervous system, causing excitement and dizziness (2,3).

The Occupational Safety and Health Administration (OSHA) has established a one-time, 10-minute exposure limit of 50 ppm during a work shift (4). NIOSH recommends that the concentration for a 10-minute sample not exceed 10 ppm and also that the area be evacuated if the concentration of H_2S exceeds 50 ppm (2).

The recommendations resulting from the Nebraska investigation provided a basis for preventing recurrence of the problem. The nature of the sewage (i.e., high concentration of H_2S) entering the plant probably contributed to the death of this worker. The NIOSH investigators recommended the plant retain a consulting firm to evaluate adding an aeration system or chemicals along the sewage-transit line to prevent the growth of bacteria that cause the production of H_2S . The average flow time through more than 25 miles of sewer pipe to the plant is approximately 8 hours. At all times, but especially during times of low flow and warmer water temperatures, the sewage becomes anaerobic, facilitating the production of H_2S by certain bacteria. The presence of H_2S had been a recurring problem at this plant. During the last stages of plant construction, a worker died in the main sewer that enters the plant; sewer gas was listed as the probable cause of death.

A second factor was the ventilation system in the mezzanine, bar screen, and wet-well areas. This system was designed to keep the entire area under positive pressure so the exhausted air could be filtered to avoid community odor problems. When the ventilation system failed during a power outage, an H_2S level of 200 ppm was measured at the doorway to the

Hydrogen Sulfide — Continued

mezzanine area before the ventilation system was turned back on. Based on this figure, NIOSH investigators estimated the level of H_2S to be in the 1,000-2,000 ppm range in the area where the incident occurred. This is considerably above the value of 300 ppm that NIOSH considers immediately dangerous (5). As an experiment, NIOSH investigators and plant maintenance personnel reversed the fan in an effort to correct the airflow to the wet-well area; the H_2S concentration dropped from 125 ppm to 7 ppm in 2 hours. The NIOSH investigators recommended that all ventilation systems throughout the plant be evaluated and deficiencies be corrected.

A third probable contribution to the death was the lack of specific procedures to ensure safe entry into areas containing potentially hazardous gases. The implementation of carefully written and enforced procedures can help prevent the same potentially hazardous conditions that existed for this fatality.

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International Notes

Quarantine Measures

Six countries have revised their vaccination requirements, effective August 1, 1986. The following changes should be made in the booklet "Health Information for International Travel, 1986."

ANGOLA

Delete information on cholera on page 15. Change yellow fever code to II > 1 yr. on page 15. Delete Angola from the yellow fever section under Requirements for Direct Travel from the United States on page 13.

BARBADOS

Delete yellow fever country list on pages 18 and 19. Code III > 1 yr. remains valid.

GABON

Change yellow fever code to I > 1 yr. on page 29. Add Gabon to the yellow fever section under Requirements for Direct Travel from the United States on page 13.

MALI

Delete information on cholera on page 40.

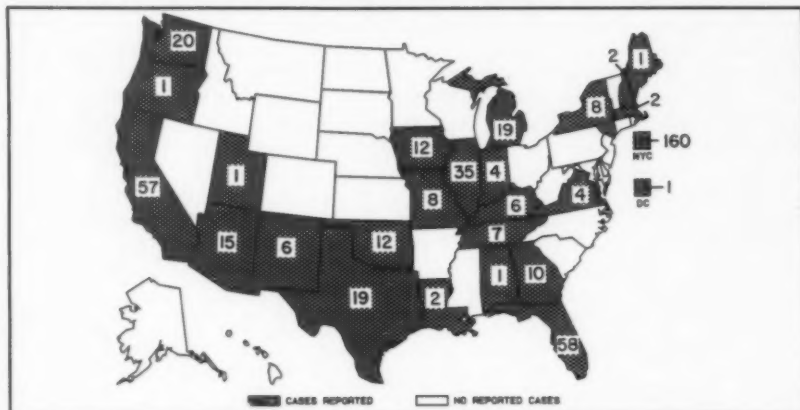
NIGERIA

Delete information on cholera on page 44. Change yellow fever code to II > 1 yr. on page 44. Delete Nigeria from the yellow fever section under Requirements for Direct Travel from the United States on page 13.

TANZANIA, UNITED REPUBLIC OF

Delete information on cholera pages 13 and 53.

FIGURE 1. Reported measles cases — United States, weeks 29-30, 1986



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The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: ATTN: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333.

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